

## ABSTRACT

Diffraction grating based fiber optic interferometric systems for use in optical coherence tomography, wherein sample and reference light beams are formed by a first beam splitter and the sample light beam received from a sample and a reference light beam are combined on a second beam splitter. In one embodiment, the first beam splitter is an approximately 50/50 beam splitter, and the second beam splitter is a non 50/50 beam splitter. More than half of the energy of the sample light beam is directed into the combined beam and less than half of the energy of the reference light beam are directed into the combined beam by the second beam splitter. In another embodiment, the first beam splitter is a non 50/50 beam splitter and the second beam splitter is an approximately 50/50 beam splitter. An optical circulator is provided to enable the sample light beam to bypass the first beam splitter after interaction with a sample. Two combined beams are formed by the second beam splitter for detection by two respective detectors. More than half of the energy of the light source provided to the first beam splitter is directed into the sample light beam and less than half of the energy is directed into the reference light beam. The energy distribution between the sample and reference light beams can be controlled by selection of the characteristics of the beam splitters.